

RICHLAND CREEK
GREENE COUNTY
2005 Fisheries Management Report

David S. Kittaka
Fisheries Biologist



Fisheries Section
Indiana Department of Natural Resources
Division of Fish and Wildlife
I.G.C.-South, Room W273
402 W. Washington Street
Indianapolis, Indiana 46204

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EXECUTIVE SUMMARY

- Richland Creek begins in western Monroe County then flows southwest through Greene County to the confluence with Plummer Creek south of Bloomfield, Indiana. This junction is less than a ½ mi from the West Fork of the White River. Richland Creek drains approximately 106 square mi.
- A general stream fish community survey of Richland Creek was conducted August 29 and September 6 and 7, 2005. Seven stations approximately four river mi apart were sampled. All fish species were collected using a Smith-Root tote barge. Available habitat was assessed using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA. The Index of Biotic Integrity (IBI) was also used to assess stream health based upon fish community. Water quality, based upon standard parameters at the time of sampling was adequate at all stations.
- A total of 4,193 fish was collected. Total weight was 205.74 lbs. There were 13 families of fish collected, including 49 species and one hybrid.
- Habitat based upon QHEI averaged 62.5 indicating acceptable habitat for warmwater game fish.
- Two stations rated in the “excellent” category based on IBI assessment of water quality. Three stations were rated as “good to excellent” and the remaining two stations were in the “fair to good” category.
- Angling opportunities at Richland Creek are best for spotted bass and rock bass. Spotted bass were collected at all stations and ranged in length from 1.6 to 14.9 in. Rock bass were collected at all but one station and ranged in length from 1.2 to 8.3 in. Twenty-five smallmouth bass were collected. Only one smallmouth bass exceeded 12.0 in. The majority of the smallmouth were age-1 fish.
- Water quality issues exist within the Richland Creek watershed. A LARE grant for water quality has been issued for the Indian Creek drainage which incorporates portions of southeast Greene County, but this work is limited to that drainage.

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INTRODUCTION

Richland Creek begins in western Monroe County and flows southwest through Greene County to the confluence with Plummer Creek south of Bloomfield, Indiana. This junction is less than a ½ mi from the West Fork of the White River. Richland Creek drains approximately 106 square mi (Hoggatt, 1975). Richland Creek is located in the Interior Plateau ecoregion (Dufour 2002).

The present survey was conducted August 29 and September 6 and 7, 2005.

METHODS

Fish sampling effort consisted of seven sites starting at RM 0.7 and ending at RM 30.2 (Figure 1). Stream width and depth were measured by averaging 15 depths and widths at five transects throughout each station. Station length was determined by the distance covered in 0.50 h of electrofishing. Station length was measured using a Bushnell® laser range finder. Fish habitat at each station was subjectively evaluated using the Qualitative Habitat Evaluation Index, developed by Ohio EPA (Rankin 1989). Habitat indexing is rated on a total score of seven metrics (0-100) evaluating substrate, fish cover, stream development, riparian width and use, depth, and stream gradient. Scores greater than 60 are generally classified as acceptable habitats for warmwater species of fish (Shipman 1997).

Water chemistry parameters were measured according to standard stream survey guidelines. Alkalinity and pH were determined at each station using a Hach® kit. Conductivity and total dissolved solids were measured with a Hanna HI 9811® meter. Dissolved oxygen (DO) and temperature were measured with a YSI 95® DO meter.

All fish were collected using a Smith-Root® Tote Barge equipped with a 2.5 GPP electrofisher. Effort consisted of 0.50 h electrofishing per station. All fish were identified to species level. Game species were measured to the nearest 0.1 in and weighed to the nearest 0.01 lb. Scale samples were taken for age and growth analysis. Non-game species were counted and bulk weighed.

Index of Biotic Integrity (IBI) was incorporated to assess stream health. IBI is a system that incorporates population dynamics of a fish community to assess the

environmental conditions of stream ecosystems (Angermeier and Karr 1986). These metrics break down the fish community based upon species richness, catch per unit effort (CPUE), fish species tolerance of environmental degradation, feeding and spawning characteristics, fish health, and their relationship to the drainage area from which they were collected. A total of 12 metrics, with a scoring range of 0 to 60, was placed within five categories including: excellent, good, fair, poor and very poor. Categories were established by previous surveys of streams within the Interior Plateau eco-region (Simon and Dufour 1998).

RESULTS

Water Chemistry and Fish Habitat

Water clarity at the time of sampling was on average 20.2 in. Dissolved oxygen ranged from 4.1 to 7.8 ppm. Water temperature ranged from 67° to 80° F. Water levels were below normal to normal at the time of sampling. Station lengths ranged from 243 to 636 ft (Appendix).

The highest QHEI score was 81.5 at RM 18.5 and RM 26. Other sample sites with scores greater than 60 were RM 11.3 (62) and RM 9.0 (77.5). Sample sites with scores less than 60 were RM 0.7 with 45, RM 3.9 (48) and RM 30.2 (42). In general, when sampling sites scored less than 60, it was a result of poor substrate scores and little to no riffle habitat.

A total of 4,191 fish was collected. Total weight was 205.74 lbs. There were 13 families of fish collected, including 49 species and one hybrid.

Minnow Family (*Cyprinidae*)

The minnow family made up 38% of all fish collected. Total weight of minnows collected was 15.71 lbs. There were 11 species of minnow present. Bluntnose minnow, striped shiner, spotfin shiner, and central stoneroller made up the majority of the minnow catch. Other species collected were steelcolor shiner, redfin shiner, creek chub, silverjaw minnow, bullhead minnow, emerald shiner, and sand shiner.

Sunfish Family (*Centrarchidae*)

Nine species and one hybrid of this family were collected. Total weight was 63.05 lbs. Members of this popular sportfish family made up 26% of all the fish sampled. Longear sunfish were the most abundant with 689 fish collected. They ranged from 0.9 to 5.9 in TL.

There were 133 spotted bass collected with a total weight of 23.80 lbs. Spotted bass ranged from 1.6 to 14.9 in TL. Eleven fish, or 8%, of the spotted bass collected were legal size (12 in) and greater. Growth data indicates that spotted bass in this system reach legal size in approximately 4 to 5 years.

A total of 49 rock bass was collected with a length range of 1.2 to 8.3 in TL. Total weight collected was 8.20 lbs. Twenty-four percent of the fish collected were 7 in and greater. Seven inches is the designation for “quality” size rock bass. Rock bass in this stream reach 7 in in 4 to 5 years. Rock bass were collected from all but one station.

A total of 25 smallmouth bass was collected ranging from 2.3 to 12.6 in TL. Total weight of the collection was 2.88 lbs. There was only one legal (12 in) size smallmouth collected. The majority of the catch was age-1 fish. There were not enough bass collected to assess growth past age 2.

Largemouth bass were collected at three stations. A total of 17 largemouth bass was collected ranging from 2.9 to 7.8 in TL.

Other sunfish collected were green sunfish, bluegill, redear, white crappie, and hybrid sunfish.

Sucker Family (*Catostomidae*)

Seven species of suckers were collected making up 17% of all the fish collected. Northern hogsucker and golden redhorse were collected at all seven stations and were the most common species collected. Other suckers collected were black redhorse, white sucker, spotted sucker, shorthead redhorse, and silver redhorse. The sucker family made up 52% of the total weight of all the fish collected.

Perch Family (*Percidae*)

Ten species of darters were collected in the Perch family. There were 657 darters collected, 16% of the total fish collection. Greenside, johnny, and rainbow darters were the most common species of this family. Other species collected were logperch, dusky, blackside, fantail, harlequin, eastern sand, and slenderhead darters. Darters are common to streams with good water quality and rocky substrates.

Catfish Family (*Ictaluridae*)

At RM 9.01, two flathead catfish were collected with a length range of 3.0 to 3.2 in. A single 6.1 in yellow bullhead was the other member of this family collected.

Lamprey Family (*Petromyzontidae*)

A single larval least brook lamprey was collected at RM 3.94. There were also two chestnut lamprey collected at RM 11.25.

Silverside Family (*Antherinidae*)

Forty-three brook silversides were collected. Individuals were collected from every sample site.

Herring Family (*Clupeidae*)

Gizzard shad was the only member of this family collected. A total of 27 shad ranging from 5.1 to 12.6 in TL was collected.

Sculpin Family (*Cottidae*)

The thirty-seven banded sculpin collected were the only members of this family represented. These fish were collected at the four upper most sample sites.

Topminnow Family (*Fundulidae*)

Eight blackstripe topminnows were collected at three sites.

Pike Family (*Esocidae*)

Three grass pickerel were collected at RM 9.01.

Bowfin Family (*Amiidae*)

A single 22.3 in bowfin was collected at RM 9.01.

Drum Family (*Sciaenidae*)

A single 15.3 in freshwater drum was collected at RM 3.94.

DISCUSSION

Richland Creek is home to a diverse community of fish species. The confluence with Plummer Creek and its close proximity to the West Fork of the White River allows fish normally found in large river systems to utilize the lower reaches of Richland Creek. Richland Creek is also home to the round hickorynut mussel which is a state listed mussel of special concern.

Water quality at the time of sampling was good. Dissolved oxygen was adequate for fish at all stations, averaging 5.4 ppm. Water clarity averaged 20 in for all stations.

RMs 11.3 and 9.0 had IBI scores in the excellent range (58-60). RMs 0.7, 3.9 and 26 scored “good to excellent”. RM 18.5 and 30.2 had scores rating their fish assemblage as “fair to good” (Table 1). With the exception of RM 18.5, which had a relatively low IBI for having a high habitat score, fish assemblage was representative of their respective habitat scores. Habitat assessment using QHEI averaged 62.5 for all sites. The lowest score was 42 at RM 30.2. This was the upper most site and appeared to have been recently dredged and channelized to facilitate drainage.

Spotted bass and rock bass are the primary game species at Richland Creek. Spotted bass were collected at all sites and rock bass were collected at all but one site.

During reconnaissance of survey sites and during sampling, livestock were observed in the stream channel at various reaches of Richland Creek. Many of the potential sample sites had some sort of exclusion fencing, indicating much of the watershed is used for livestock and agriculture. Habitat and IBI scores indicate adequate water quality and habitat for smallmouth. However, the lack of larger fish may indicate

high angler harvest, or more likely, seasonal high water moving sediments during critical times of the year, limiting survival of larval smallmouth bass. This could explain the lack of consistent recruitment.

Currently there is a Lake and River Enhancement (LARE) grant for water quality issues in the Indian Creek watershed. This grant covers portions of Greene County, but this is currently designated for the Indian Creek drainage. Considerations should be made to expand the state LARE funding to the Richland Creek drainage and/or petition the Greene County SWCD to pursue a Federal 319 grant for soil and water quality in the Richland Creek watershed.

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Submitted by: David S. Kittaka, Fisheries Biologist
Date: December 12, 2006

Approved by: _____
Brian M. Schoenung, Fisheries Supervisor
Date: March 14, 2007

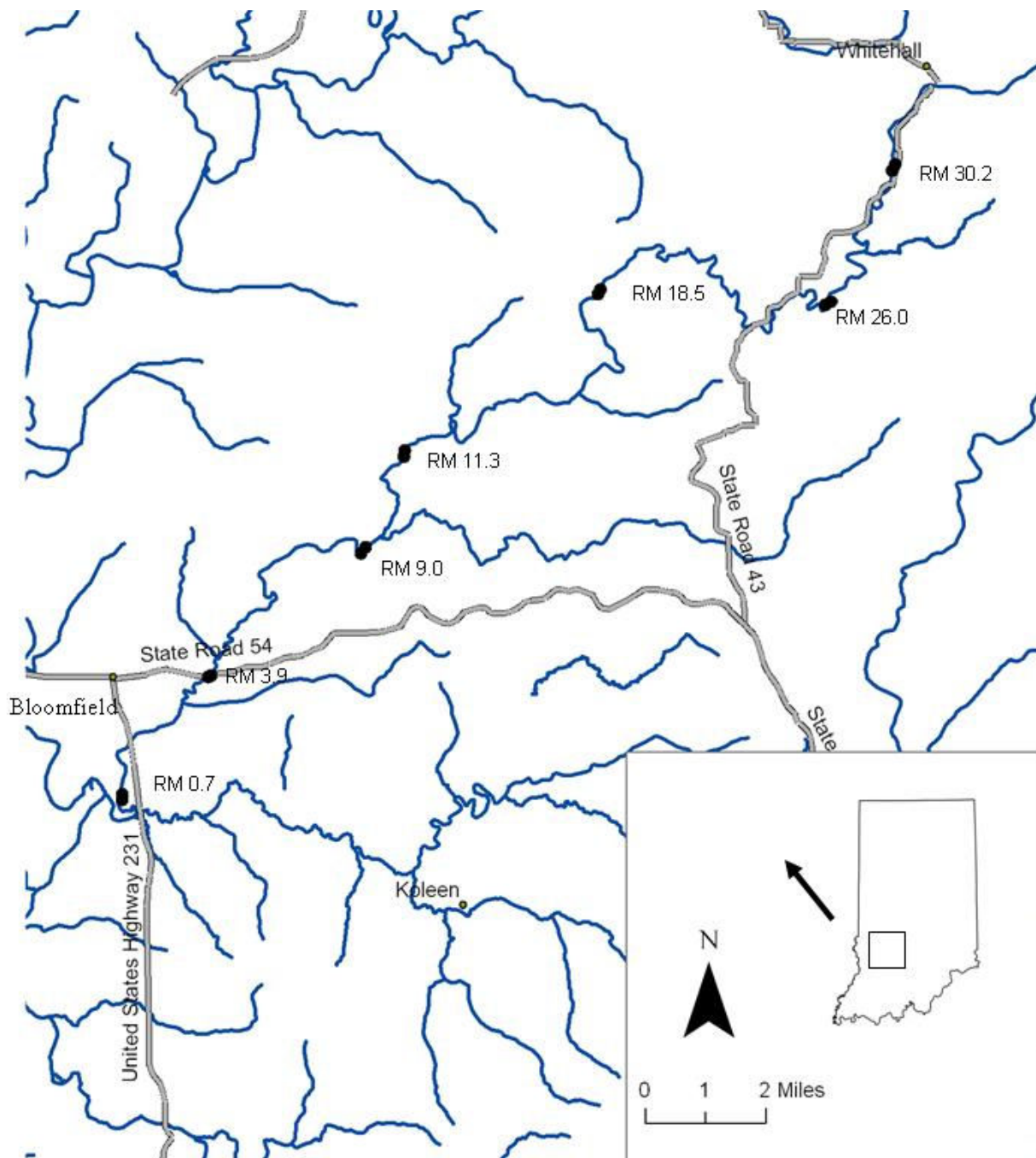


Figure 1. Richland Creek, Greene County, sample locations by river mile (RM), 2005.

Table 1. Index of Biotic Integrity score ranges and description of categories.

Integrity Class	Excellent	Good	Fair	Poor	Very Poor	No Fish
Total IBI score	58-60	48-52	40-44	28-34	12-22	0

-“Very Poor” category is described as few fish present, mostly introduced or tolerant forms, hybrids common, disease, parasites and physical anomalies common.

-The “Poor” category is described as being dominated by omnivores and tolerant species, having few top predators, and growth rates and condition factors commonly depressed.

-The “Fair” classification is described as having a loss of intolerant species, increased frequency of omnivores and other tolerant species and an older age class of top predators.

-The “Good” category is described as having species richness somewhat below expectations, especially due to loss of the most intolerant forms; some species are present with less than optimal abundances of size distributions; trophic structures showing some signs of stress.

-“Excellent” is described as comparable to the best situation without human disturbance and a balanced trophic structure.

APPENDIX

Indiana Division of Fish and Wildlife, Stream Habitat Evaluation Forms

Qualitative Habitat Evaluation Index score sheet for each station

Station summary for Richland Creek 2005

Name, Number, Percentage, Size, Weight and Occurrence of fish collected at Richland
Creek, 2005

Mean length at age for spotted bass, rock bass, and smallmouth bass, Richland Creek
2005

Length frequency of game fish collected at Richland Creek, 2005